

GENERAL SAFETY PRECAUTIONS

PLACING, REMOVING, OR MAINTAINING POLES, CABLE, GUYS, WIRE, AND STRAND NEAR POWER

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1. GENERAL		2.01 Know what voltages are involved. Do not assume the voltage in any power source. Do not pretend the lower secondary voltages are not dangerous and lethal. Take the necessary steps to do the work operation safely.
1.01 This section covers the general safety precautions to be observed when working		

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2.02 Detailed plans, work orders, or drawings that involve joint-use plant or non-joint power crossing plant must show the voltage involved, clearances required, and any hazardous condition that may be encountered during the work operation. If the specified clearances on the work order or the minimum clearances as shown in the clearances sections cannot be met, notify your supervisor or the engineering forces.

2.03 The prevention of contacts between telephone plant and power conductors and maintaining the required clearances are the responsibility of each employee. It is the prime concern of both supervisors and employees when working on joint-use poles, on power crossings, or in the vicinity of power conductors.

2.04 Prior to the start of work operations, each employee should be informed of the hazards involved and a job plan should be formulated to include the necessary steps to complete the work operation safely.

2.05 In the case of emergency work, storm damage, broken poles, wire down, etc, do not start work operations until the utility company has cleared away, restored, or made safe all power conditions on the pole and in the vicinity. This must be affirmed by a responsible employee of the utility company.

2.06 Insulating gloves and protectors must be worn by all persons handling poles, cable, wire, strand, guys, and associated equipment during placing, removing, tensioning, tying, grounding, etc, in the vicinity of power conductors. In addition, avoid all contact of exposed unprotected parts of the body with any reel, wire, pole, motor vehicle, etc, during periods when there is a possibility of power contact.

2.07 Under **no condition** it is permissible to get closer than the minimum approach distance to energized exposed power conductors with any part of the body or with any noninsulated tool, pole, basket platform, etc, as listed in Table A unless the conductors have been deenergized and grounded or the employee or equipment is insulated from the conductor.

2.08 Never use any pull lines, control lines, etc, other than dry manila rope, or its equivalent,

of sufficient size and strength for the particular work operation in the vicinity of power conductors. (See Section 081-510-101.)

2.09 Each employee must be familiar with the hand signals to be used as outlined in Section 620-020-020, Signals for the Use of Outside Plant.

2.10 Wear the standard eye and head protection during all work operations.

2.11 Ground telephone wire, cable, strand, etc, during placing, rearranging, removal, and tensioning operations. To be effective, the ground should be made to a low resistance ground such as the vertical ground conductor of a common neutral power system or in-place cable and strand, etc. However, this additional protection in no way modifies or makes unnecessary the safety precautions outlined in this section or sections on specific work operations.

2.12 Never make the ground connection in the space above telephone attachments. Test vertical power guy or ground wire of a multigrounded neutral as outlined in Section 620-105-010 before any connections are made.

2.13 It is essential for the safety of telephone employees, the general public, and telephone plant that the required clearances be maintained as outlined in the 620 division of the Bell System Practices and the detailed work plans.

3. IDENTIFYING POWER

3.01 Clearance, approach distances, and safety protection from power conductors, in most cases, are determined by the voltage involved and the type of construction used by the power company.

3.02 Conductors of the same size and construction may be carrying completely different voltages and require different clearances and safety measures appropriate to the situation. The voltage on the conductors varies depending on the particular system of connections and grounding used by the power company.

3.03 The type of construction must be considered for clearance purposes. Open uninsulated conductors always require maximum clearance for the voltage involved. Clearance from spacer cable and sheathless cable is determined by the voltage;

TABLE A
MINIMUM APPROACH DISTANCES*

VOLTAGE PHASE-TO-PHASE	VOLTAGE PHASE-TO-GROUND	MINIMUM DISTANCE IN INCHES
300 volts and less	173 volts and less	Avoid contact
300 volts to 750 volts	173 volts to 434 volts	12
750 volts to 2000 volts	434 volts to 1160 volts	18
2000 volts to 15,000 volts	1160 volts to 8650 volts	24
15,000 volts to 37,000 volts	8650 volts to 21,400 volts	36
37,000 volts to 87,500 volts	21,400 volts to 50,500 volts	42
87,500 volts to 121,000 volts	50,500 volts to 70,000 volts	48
121,000 volts to 140,000 volts	70,000 volts to 81,000 volts	54

* Not to be confused with clearance distances.

whereas, with sheathed cable, voltage is not a factor. Fig. 1 shows various types of power conductors.

- 3.04 The voltage involved in joint-use and power crossing poles is difficult to determine accurately in the field.



Power construction and equipment vary between areas and utilities. If you do not know or cannot accurately determine the voltages, contact your supervisor, the engineering forces, or the local utility company before proceeding with the work operation.

4. MEASURING CLEARANCES AND SEPARATIONS

- 4.01 For the safety of telephone personnel and the general public, it is essential that the required clearance and separations from power conductors and power equipment be maintained. Measurements can be made safely using the approved

measuring devices and insulating gloves when required.

- 4.02 A standard measuring rule, or the approved equivalent free of metal edging, can be used to measure clearance from power circuits of 750 volts or less on the pole. Wearing insulating gloves, measurements can be made without contacting the power conductors or equipment by measuring along the pole, crossarm, or other nonmetallic parts of the supply structure; adjustments can be made for changes in elevation or position of the wires on metallic parts.

- 4.03 If supply circuits of more than 750 volts are in place, separations should be estimated from the gains or bolt holes to the power conductors; the measuring rule can be used from the gains or bolt holes, if below the power structure, to telephone plant. Insulating gloves must be worn.

- 4.04 For measuring clearance and separations in the span, refer to Table B.

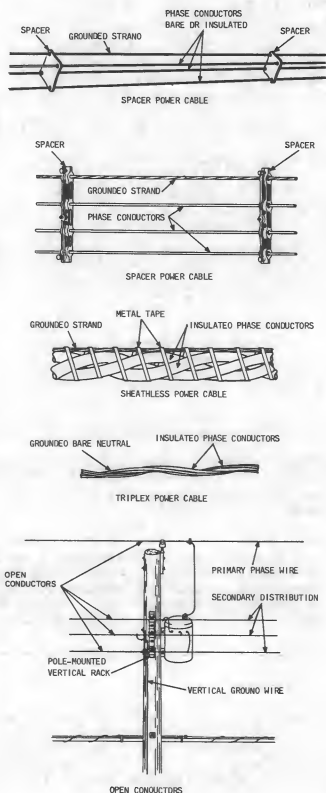


Fig. 1—Types of Power Conductors

5. USING TRUCK-MOUNTED EQUIPMENT NEAR POWER

5.01 The person operating the lift, winch, derrick, motor vehicle, etc, must be thoroughly familiar with the equipment and the method of operation.

5.02 All the required safety system test and inspections of the motor vehicles and equipment must be made prior to the start of work operations as outlined in the section covering the specific motor vehicles and equipment in the 649 division of the Bell System Practices.

5.03 Survey the work location for hazardous conditions, ie, clearance from power, terrain, traffic, or other situations that could affect the clearance of the boom, pole, derrick, basket platform, or employee from power. Ensure that each employee is made aware of the assignment, the nature of the work, and the precautions to be observed.

5.04 If the minimum clearances cannot be met, refer the condition to your supervisor.

5.05 At no time during pole placing, moving, or removal shall the derrick head come any closer than 3 feet to the lowest power conductor unless the voltage is verified below 750 volts and affirmed by your supervisor. If the voltage is over 37 kv, phase-to-phase, the derrick head is never to cover closer than 6 feet to the conductor.

5.06 Guard all the work areas as outlined in the 620 division of the Bell System Practices.

5.07 Before starting work operations, place insulating gloves and protectors in the bucket or basket of the lift vehicle. Remove insulating gloves, protectors, and insulating blanket from storage and place in the cab of the vehicle or other location where they will always be available in the event of an emergency.

5.08 All employees handling poles, wire, cable strand, or tools must wear insulating gloves and protectors when there is any possibility of a power contact. No parts of the body, other than the glove-protected hands, shall contact the pole, cable, wire, truck, or equipment during the period of possible contact.

TABLE B
RECOMMENDED MEASURING TOOLS

TOOLS (BY GROUPS)	TELEPHONE LINE WIRES, CABLES, GUYS, AND DROP WIRES	SUPPLY CABLES, MULTIGROUNDED NEUTRAL WIRES, GUYS, AND 0-750 VOLT SUPPLY WIRES	ALL OTHER SUPPLY WIRES	REMARKS
GROUP 1 Clearance measuring lines, nonmetallic linen tapes, ropes, etc	Yes	Must not be used	Must not be used	Tools must be dry and free of metallic strands or threads
GROUP 2 Tree pruner handles, pike poles, rods of wood, bamboo, etc	Yes	No	Must not be used	
GROUP 3 B clearance rule	Yes	Yes	Yes	
GROUP 4 Transits, sextants, range finders, hand levels, tele- heights, hitemeters, etc	Yes	Yes	Yes	

5.09 The driver of the vehicle shall ensure that no contacts exist between the lift, pole, derrick, etc, and any energized conductor by observation and communication each time he enters or leaves the vehicle. If there is any doubt as to whether contact exists, the driver must assume the vehicle is energized.

5.10 If a power contact exists, the entire vehicle, its contents, and equipment are energized. No one shall be permitted to contact, enter, or leave the vehicle. If an emergency arises, the following steps must be taken to enter or leave the vehicle.

(1) **Leaving Truck:** Put on insulating gloves and throw an insulating blanket on the ground. Jump off the vehicle onto the blanket. Avoid all contact with grounded objects such as tree limbs, shrubs, personnel, etc, until free and clear of the vehicle.

(2) **Reentering Truck:** Put on insulating gloves, step on insulating blanket, and break

all contact with grounded objects before touching the vehicle.

5.11 *It is never permissible* for the operator to stand on the ground while operating the winch or derrick controls, even if wearing insulating gloves and standing on an insulating blanket. While standing on a truck platform and operating these controls, the operator need not wear insulating gloves or stand on an insulating blanket, but these protective devices must be within easy reach for emergency use as instructed in 5.10.

6. PLACING OR REMOVING POLES NEAR POWER

6.01 The work prints, detailed drawings, etc, must show the voltage of the power conductor and whether or not enough distance can be maintained during the work operation, in order to eliminate the need for insulating the pole and the wearing of insulating gloves.

6.02 When a pole is within, or will come within, 20 feet of power during a placing or removal work operation and the voltage and clearance have

not been specified, obtain this information from your supervisor, telephone engineering forces, or the local utility company before any work is begun.

6.03 If the work print indicates that enough distance cannot be maintained and the voltage is 20,000 volts or less to ground (34,500 volts or less phase-to-phase), the pole must be insulated and employees must take the necessary precautions as outlined in Section 621-205-010.

6.04 If the voltage is above 20,000 volts up to 86,000 volts to ground (above 34,500 volts to 150,000 volts phase-to-phase), the pole may be placed or removed **only** if the in-place clearance is 15 feet or more and the power conductor is, or will be, higher than the in-place pole. If the in-place clearance is less than 15 feet, the power company must be contacted. They may elect to:

- (a) Insulate the conductor,
- (b) Move the conductor,
- (c) Deenergize the conductor, or
- (d) Place or remove the pole.

No telephone work is to proceed until a responsible employee of the power company affirms one of the options has been completed.

6.05 When a pole is being placed or removed, make very effort to prevent contact with power conductors.

6.06 All employees handling the pole with their hands or with pike poles or other tools must wear insulating gloves and protectors when there is any possibility of contact with power conductors. Except for glove-protected hands, do not allow any part of the body to contact the pole, tools, truck, or other equipment that could become energized during the period of power contact.

6.07 If truck-mounted equipment is being used to place or remove the pole, refer to the precautions of Part 5 of this section.

6.08 Before a pole is removed, all attachments must be removed. Electric company attachments, **in all cases**, must be removed by the electric company.

6.09 On joint-use or joint-crossing poles, do not place any telephone attachments if the power company has not transferred their attachments as they may contact the pole. If the new and old poles are lashed or tied together in such a manner that movement of one does not result in bringing the power conductors closer to the other, and the power attachments are firmly fixed to the old pole with **standard clearance** from the planned location of the telephone attachments on the new pole, attachment of telephone plant to the new pole may proceed. When a telephone employee must work aloft on a newly placed pole for the purpose of placing the lashing wire or otherwise securing the new and old poles together, the winch, derrick, pike poles, or other tools and equipment used to maintain relative positions of the old and new poles shall remain in place until the locking is completed.

6.10 Do not place or remove poles near power wires carrying over 5000 volts to ground during substantial rain, sleet, or wet snowfall.

6.11 Before placing, insulate **all poles** that have been lying in wet snow, water, or mud.

6.12 Always attach the winch line above but close to the balance point so the butt end is heavy; this allows the derrick head to be as low as possible.

6.13 Allow for the rise of the derrick head when the pole is placed in the hole and the weight of the pole is released.

6.14 When handling a pole among existing power lines, it may be desirable to position the boom first and then raise or lower the pole by using the winch line so the pole can be more readily guided between the lines.

7. PLACING OR REMOVING OPEN WIRE NEAR POWER

7.01 All employees must wear insulating gloves and protectors during placing, rearranging, removal, or tensioning operations on joint-use poles or where the wires cross over or under power conductors. In addition, avoid all body contact (other than glove-protected hands) with reels, wire, guys, motor vehicles or other equipment that could become energized.

7.02 The wires must be grounded before pulling in for additional protection as outlined in the 623 series of sections on specific work operations.

7.03 Test all vertical power company grounds and power guys to be used for grounding as outlined in Section 620-105-010, using the voltage tester.

7.04 At upward changes of grade, special construction may be necessary such as extra crossarms, guard arms, or bracket loops, as outlined in Section 623-103-010, to prevent the wires from flipping up into contact with the power conductors if an insulator, pin, tie, etc, loosens or breaks.

7.05 When placing wire on joint poles or crossings under power wires, it is desirable to string the wire on the ground, then place it on the crossarm or bracket with the wire raising tool. Where conditions do not permit it being layed on the ground, the wires may be pulled in over the crossarms. It should always be pulled using a hand line attached to the end of the wire.

7.06 At power crossing spans, always use a handline over the wire to prevent the wire from flipping up into the power while pulling in or tensioning. Do not remove the handline until the wire has been tensioned and tied in.

7.07 When pulling wire in on joint-use poles, it is advisable to place the wires over every other crossarm to help prevent flip-ups. The wire should be controlled at change of grades by handlines, guard arms, or tying down to a crossarm. Do not remove these ties or handlines until the wire has been tensioned and tied.

7.08 When placing wire over power conductors, observe special precautions to prevent the wire from sagging into the power conductor. Use a rope guide or a rope screen which is constructed as outlined in Section 623-210-200.

7.09 When using moving or stationary reels to string wire, it is essential that braking on the reels is sufficient to maintain the proper tension on the wire. Inadequate tension could cause the wire to sag, catch on branches, etc, or to flip up into the power conductors.

7.10 When removing wire from over power conductors, proceed as follows:

- (a) If possible, have the power company deenergize the conductor.
- (b) Temporarily head-guy each crossing pole with 3/4-inch manila rope to prevent sag as wires are removed.
- (c) Use only 1/2-inch or larger dry manila or equivalent rope for withdrawing the wire.
- (d) Remove only one wire at a time unless the power has been deenergized.
- (e) Complete removal of each wire before cutting the next.
- (f) Maintain complete control of both ends of the wire and maintain enough tension to prevent sagging and whipping of the wire.

7.11 When removing wire under power conductors, keep the wire tensioned with pulling and drag lines. Control all up-pulls with handlines or by tying at grade changes or by placing a guard arm.

8. PLACING OR REMOVING MULTIPLE LINE WIRE AND RURAL WIRE NEAR POWER

8.01 Insulating gloves and protectors must be worn during all placing, removing, tensioning, and grounding operations on joint-use poles and poles involved in power crossings. In addition, avoid all body contact with reels, wire, motor vehicles, and equipment that may become energized in the event of a power contact.

8.02 Prior to stringing wire from a moving reel or prior to sagging when using a stationary reel, ground the strand and/or conductors to a low resistance ground as outlined in Sections 624-200-011 and 624-700-200.

8.03 Test all vertical power company grounds and power guys to be used for grounding as outlined in Section 620-105-010 using the voltage tester.

8.04 Make certain that adequate clearance is maintained from the power conductors and

that the wires are controlled to prevent contact with power.

8.05 Where practical, it is desirable to string the wire on the ground, then raise it to the brackets or fasteners with the wire raising tool.

8.06 Pull the wire with a steady even pull and avoid rough handling to prevent flip-ups and surging.

8.07 Prevent the wire from catching on branches, undergrowth, brush, etc. Any sudden release of the wire could cause the wire to flip up. If the wire becomes caught, lift it off and around the obstruction with the wire raising tool. If necessary, control the wire with a handline.

8.08 At upward changes in grade, keep the wire from raising into power conductors with a handline or with a block securely fastened to the pole.

8.09 At power crossings, plan the job so that a minimum amount of wire is pulled over or beyond the crossing poles. Tension and attach the wires as soon as practical.

8.10 Whenever wire is to be placed over power conductors, support the wire on a 1/2-inch manila rope, or equivalent, as outlined in Section 623-210-200.

9. PLACING OR REMOVING SUSPENSION STRAND AND CABLE NEAR POWER

9.01 Insulating gloves must be worn by all employees handling the strand, reels, ropes, associated trucks, trailers, etc, during placing, removing, tensioning, dead-ending, and grounding operations on jointly used poles or non-joint poles involving power crossings. Wear insulating gloves and avoid body contact until the strand has been placed in the clamps, tensioned, dead-ended, and all permanent grounds have been attached where required.

9.02 Suspension strand that is being placed must be grounded by the use of the B grounding roller for stationary reel jobs or by grounding to the power company vertical neutral of a common neutral system. The strand must also be grounded when using the moving reel. A low resistance

ground connection is essential and should be made as outlined in Section 627-230-203.

9.03 The end of the strand on self-supporting cable should be grounded when using the moving reel method. Extra special precautions to guard against flip-up are required when placing self-supporting cable using the stationary reel method, and the strand should be grounded as soon as physically possible.

9.04 Test all vertical power company grounds and power guys to be used for grounding as outlined in Section 620-105-010 using the voltage tester.

9.05 All ropes used in conjunction with placing strand on joint-use or power crossings must be dry and free of metallic strand. Never use a winch line when placing or removing strand on joint or power crossing poles.

9.06 When using a moving reel, use care to prevent the strand from whipping or fouling on the reel. Moving the vehicle too fast, the reel not turning smoothly, or improper brake tension can cause whipping and a potential power contact.

9.07 At upward changes of grade (low poles) on jointly used lines, a block should be lashed at the strand level to prevent the pulling-in line and strand from rising into the power conductors.

9.08 When pulling in strand on joint-use or power crossing spans and there is any possibility of the strand whipping up into the power conductors, it should be held down by means of a 3/8-inch or larger dry rope until stringing and tensioning operations are complete.

9.09 At crossings below power conductors, place the strand along the ground, secure it to the butt of the first crossing pole, and raise the strand on both poles. Use a 3/8-inch or larger safety rope to prevent accidental contact. Use the safety rope until tensioning is complete. (Refer to Section 627-230-201.)

Note: Do not place strand over power conductors of 750 volts or more.

9.10 Where strand is to be placed over power conductors of less than 750 volts, use three dry ropes: support rope, ring rope, and pull rope,

as outlined in Section 627-230-201. If cable is to be placed, leave the support rope and ring rope in place for pulling in the cable.

9.11 To remove cable in rings over power conductors, place cable blocks at intervals of 10 feet or less and 20 feet beyond each crossing pole in case the rings should break. Cable blocks can be placed by lift truck, cable car, or ladder. When using a cable car and there is insufficient clearance, it may be necessary to place a temporary strand to support the cable car and facilitate placing the blocks. Place the temporary strand as outlined in Section 627-230-201. Maintain tension on the drag line to prevent the cable dropping as it leaves the cable blocks. (Refer to Section 627-380-240.)

9.12 To remove lashed cable over power conductors, remove the lashing wire with the lashing wire remover and place cable blocks to support the cable. Attach a pulling and drag line as well as a ring rope. Cut the cable; prevent the cable from dropping by maintaining tension on the drag line. The ring rope is to be used to remove the strand and should be tied to both crossing poles. (Refer to Section 627-380-240.)

9.13 Remove strand with support, pulling, and ring ropes as outlined in Section 627-380-240, Part 4.

10. PLACING OR REMOVING GUYS NEAR POWER

10.01 Insulating gloves must be worn by all employees placing, removing, or working on guys on joint-use or power crossing poles.

10.02 In selecting locations for guys, avoid crossing power conductors of any voltage where there are other alternatives. Do not place guys above power conductors of more than 750 volts.

10.03 Ground or insulate all guys exposed to power as detailed on the work prints or as specified in Section 621-405-011.

10.04 Before grounding to vertical multigrounded neutrals of the power company or the power guy, test as outlined in Section 620-105-010.

10.05 Under no conditions shall any telephone employee make any connection above telephone space, nor climb above telephone space for any reason.

10.06 Use extreme care when cutting guy wire near power to prevent the cut ends from flipping up into possible power contact.

10.07 When placing or removing pole-to-pole or pole-to-stub guys over power conductors or trolley feeders of 750 volts or less, the guy must be supported, placed, and removed with dry manila (or polypropylene) rope as outlined in Section 621-420-241. Extreme caution must be used and tension on the drag line must be sufficient to keep the guy from dropping into the power conductors.

11. PLACING OR REMOVING DROP WIRES NEAR POWER

11.01 *Never* place drop wire over primary power conductors. If there are *no other alternatives*, drop wire may be placed over secondaries or trolley wires of **750 volts or less** if the safety precautions in this section and in Section 462-400-206 are followed. If possible, avoid the situation.

11.02 Insulating gloves and protectors must be worn during placing and removing of drop wire over the power conductors or at *any* time drop wire may contact any power conductors. Insulating gloves must also be worn when handling ropes, reels, or other tools exposed to power conductors.

11.03 Do not allow any part of the body other than the glove-protected hands to contact wire, rope reels, etc.

11.04 Use only dry manila rope or its equivalent to pull in the wire. Use adequate tension on the reel to prevent the drop wire from sagging and making unnecessary contact with the power conductor.

11.05 Minimize the amount of exposure time of the drop wire or headline to power by planning the work operation and raising the wire without delay.

11.06 Placing a drop wire over trolley wires always requires two employees. Both shall use insulating gloves and protectors.

11.07 One employee controls the reel end of the drop wire and the other employee maintains enough tension on the hand line to pull in the drop

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wire. The drop wire must *not* be permitted to *contact* the trolley wire.

11.08 When replacing drop wire over secondaries or trolley wires, the same precautions must be observed as for placing.

11.09 Verify that the drop wire clearances conform to the requirements in Section 462-070-015.